

**ENVIRONMENTAL HEALTH MANAGEMENT IN SHELTERS;
GUIDELINES AND TRAINING TOOLS FOR
SHELTER MANAGERS IN THE CARIBBEAN**

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Being an integral part of mans' existence, environmental sanitation must be given adequate priority post disaster. After a disaster environmental sanitation measures are necessary for protecting the environment from the human waste normally responsible for the contamination of food and water. Such measures also counteract the development of breeding sites of disease vectors and pests.

Excreta disposal should receive primary consideration. Improper disposal not only leads to the contamination of water and food supplies, but it also attracts flies and other disease carrying pests.

Other measures that should be taken includes providing a sanitary solid waste system, such as, receptacles, means of transportation, and incineration and burial facilities on shelter compounds, provision of a disposal services.

As soon as rescue work has started accomodating displaced persons under conditions that will not lead to the deterioration of public health and the environment should be considered. Existing public buildings - schools, meeting halls, churches and hotels - often are choosen as temporary shelters because they can be easily converted into dormitories. They are also likely to have cooking sources of water supply, waste disposal, bathing, washing and cooking facilities. Facilities for mass feeding is sometimes provided.

Within emergency shelters, a high level of sanitation must be maintained at all times considering the large numbers of people from varying backgrounds who are brought together under the same roof.

A post disaster assessment of damage and needs must be made within the shelters to ascertain working conditions of essential facilities provided.

The shelter manager should appoint a shelter management committee, including medical personnel both preventative and curative. Also requests may be made for volunteers to assist with the monitoring of basic sanitation activities within and around the shelters.

In laying down guidelines for the operation of the shelter management committee, priority must be given to establish sanitation regulations according to what is feasible and these should be strictly observed.

It is advisable that the shelter be separated into two areas; a residential area and a community service area including a mass feeding centre and recreational etc.

Strict monitoring of the following environmental health areas are of utmost importance;

1. WATER SUPPLY

Provision of a safe and adequate supply of water is essential, and it is the responsibility of the environmental health personnel involved in emergency relief work to make certain that such a supply is available and accessible. The bacteriological, chemical and physical condition of the water for human consumption must comply with established standards. The minimum water requirement for drinking, cooking and basic cleanliness at temporary shelters is 15-20 litres/person/day. Unless there are severe limitations on the supply of safe water, no restrictions should be placed on its use. If there is a shortage, rationing, close supervision of consumption, and other water conservation measures should be practiced. As soon as the early days of the emergency have passed and the water supply has increased, restrictions should be lifted since there is a correlation between water consumption and cleanliness on the one hand and between cleanliness and incidence of disease on the other. With no restrictions the use of water may approach 100 litres/person/day. Depending on the source of the water supply identified by the environmental health relief personnel, either of the following forms of purification should be employed at the shelter -;

- chemical purification (chlorine tablets - may be used to purify water used for bathing and other domestic purposes).
- mechanical purification (boiling - preferably used with are for drinking and cooking).

2. EXCRETA DISPOSAL -

Unsatisfactory disposal of excreta is common immediately after a natural disaster. Unless prompt measures are taken to provide proper means of disposal, the following environmental problems may be created;

- a. creation of fly breeding places.
- b. development of unpleasant odours.
- c. contamination of soil and water sources.
- d. contamination of food by flies and dust.
- e. increase in the incidence of disease, especially helminthic and enteric diseases.

The importance of proper disposal of excreta cannot be overemphasised. Excreta disposal facilities should be;

- a. be cleaned daily (Persons should be designated to clean sanitary installations).
- b. located well away (30-40 ft) downhill from drinking water.

In the instance where water closets are provided but due to a disruption in the water supply it is advisable that these should not be used since it is difficult to maintain an approved level of sanitation. In the absence of the water closet the construction of facilities as described in appendix 9 are recommended.

3. SOLID WASTE DISPOSAL

There is a correlation between the improper disposal of solid wastes and the incidence of vector borne diseases. Provisions must therefore be made for effective storage, collection and disposal. If the shelter is located in an urban area the municipal collection service, when restored should be utilized. In emergency shelters individual families may be provided with washable, water tight containers with tight fitting covers. Organic waste must be stored separately from inorganic material. Container capacity should not exceed 100 litres, 3 - 4 containers may be provided for every 100 persons. They must be so located so that each family has a container within easy reach. It is recommended that a communal area be provided on the shelter on the shelter compound for waste storage prior to disposal, these facilities must have concrete floors, walls, floor drains and a water supply and must be emptied daily. In the absence of a previously existing garbage removal service or prior restoration of service all types of trucks may be used. Refuse may be disposed of at a sanitary landfill, be buried, incinerated or dumped openly. The burial method is commonly used for shelters where there is adequate landspace on the compound and where earth moving equipment is available. A trench 1.5m wide by 2m deep is excavated, and at the end of each day the refuse is covered with 20-30 cm of earth and compacted and a new trench is dug. Where burial is not practical incineration should be done, depending on the number of persons being served a 45 gallon drum may be used (one drum, /family). The open dumping method must be avoided. In extreme situations refuse may be hauled to suitable dump sites for dumping and burning provided the sanitation personnel supervise the operation.

Animal Carcasses - may be disposed of either by burial or burning or a combination of both. It is advisable that such disposal be done at a centralized location, especially for larger animals.

4. FOOD SANITATION -

It is advisable that immediately post disaster an organised food inspection mechanism be established by environmental health personnel. Unless proper sanitary measures are applied to the storage, preparation and distribution of food under emergency conditions, mass feeding will be a constant danger to health. Food is easily contaminated and has the ability to support the growth of pathogenic organisms more over, other services connected with the protection of food, namely water supply, waste disposal and vector control, are carried out in an improvised manner during emergencies, conditions therefore favour outbreaks of food borne diseases, the consequences of such an outbreak could be extremely grave because the medical and nursing services, which might already be short staffed and swamped with urgent cases, would not be able to cope with the situation. These considerations show clearly the necessity for the proper planing and operation of food sanitation programs in shelters.

The Environmental Health Officer is responsible for recording;-

- (a) quantity of food stuffs.
- (b) types of food stuffs.
- (c) lines of supply and means of distribution, so that the proper sanitary safe guards may be employed. The first move, is to bring together all health, supply, welfare and other officials involved in the provision of food in order to develop a reasonable plan for the sanitary supervision of food supply and installations.

The measures that can be applied to ensure good food sanitation includes:

- (a) quality control of incoming food in order to detect spoilage and contamination.
- (b) quality control of water used in food preparation. Where water is not available on the compound water must be transported, stored and in a sanitary manner.
- (c) provisions for proper storage and cooking of foods.
- (d) control of insects and rodents in stores, kitchens and feeding centres.
- (e) provisions for proper disposal of liquid and solid waste.
- (f) provisions of proper washing and sanitizing of utensils.
- (g) supervision of food preparation.
- (h) supervision of foos serving.
- (i) supervision of cleaning of premises where foods are handled.
- (j) management of food handling personnel, which includes;-
 - i. health checks
 - ii. training of food handlers
 - iii. ensuring that numbers are adequate (food handling)
 - iv. provision of adequate sanitary facilities
 - v. establishment of a vigilant inspection service by environmental health personnel

5. VECTOR CONTROL -

Conditions immediately after a disaster favour a rapid increase in the population of insects and rodents. The immediate cause may be the breakdown of sanitary facilities, such as collection and disposal of refuse and subsequent provision of sites suitable for extensive breeding and harbouring of vermin. The accommodation of large numbers of people in temporary shelters under such conditions will expose them to disease carried by insects and rodents. The vectors most likely to be present in temporary shelters and the main disease they may transmit through biting, skin infections, and pollution of food and water are listed below:-

VECTORS	MAIN DISEASE
mosquitoes:	yellow fever, viral malaria, dengue
houseflies:	encephalitis, filariasis, diarrhoea, dysentery, conjunctivitis, typhoid fever
cockroaches:	diarrhoea, dysentery salmonellosis
lice:	endemic typhus, pediculosis, relapsing, skin irritations, fever, trench fever,
bed bugs:	severe skin inflammation
cone nosed bugs:	chagas disease
ticks:	tularemia, relapsing, fever, rickettsial pox viral encephalites
rodent mites:	rickettsial pox, scrub typhus
rodent fleas:	bubonic plague, endemic typhus
rodents:	rat bite fever, leptospirosis, meliodiosis salmonellosis,

Vector control programs should be planned so as to cope with two distinct situations:

- a. The initial or emergency phase, immediately following the disaster, when control work should concentrate on destruction, by a physical or chemical process, of vermin on persons, their clothing, bedding and other belongings. An emergency sanitation team should be available from the beginning for carrying out this disinfestation.
- b. The period after the emergency has subsided, when control work should be directed towards the proper food sanitation, safe disposal of waste including drainage, and insects and their breeding and harbouring places should be carried out throughout the post disaster period.

OVERCROWDING:-

Each shelter must provide at least 3.5 sq metres of floor space per individual to avoid overcrowding. For better shelter management and control of communicable diseases, large numbers of people must be avoided. The development of diseases must be closely monitored within the shelters. Shelter managers must

encourage victims to take residence with relatives as soon as possible after the disaster.

VENTILATION:-

Natural ventilation must be adequate. Inmates must feel comfortable with the doors and windows open.

EDUCATION OF DISASTER VICTIMS IN SANITATION:-

Experience has shown that sanitary installations provided as part of the relief work after disasters do not always fulfill their purpose because they are either misused or not sufficiently used. Among the most important reasons for this lack of appreciation among disaster victims are:

- (a) the psychological effects of the disaster, manifested mainly in an apathetic attitude;
- (b) the victims' low living standards before the disaster; and
- (c) their ignorance as to the use and maintenance of the installations provided.

In itself, therefore, the provision of sanitary installations is not enough to solve the problem; the people must use them properly and frequently so that an adequate level of personal cleanliness and environmental is attained. It is therefore with the shelter management team to participate actively in educating the disaster stricken people to use rules of personal hygiene, and to safeguard the health of the community. A number of points concerning education must be borne in mind:-

(i) To be successful, education should be based on the trust and collaboration of the people. To gain their confidence, it is extremely important that the health worker should have a sympathetic disposition; an authoritative attitude is detrimental.

(ii) The sanitary installations used should be of a type easily understood by the people. Simple and accessible solutions can generally be devised without sacrificing the basic principles of sanitation. If a complex installation is unavoidable, patient and constant instruction is necessary to make it understood and ensure that it is used properly.

(iii) On the spot education is most effective.

(iv) In relief situations of short duration, there is not enough time to start educational processes and the proper operation of sanitary installations depends on effective inspection.

(v) Media for mass education have proved their value in emergencies.

The areas in which sanitation education is needed include:-

- (a) avoidance of using contaminated or doubtful water
- (b) avoidance of wasting water
- (c) co-operation in using the excreta disposal installations properly and in keeping them clean
- (d) avoidance of scattering refuse and observance of rules for its proper collection
- (e) co-operation in reducing insect populations
- (f) cleanliness of the shelter
- (g) cleanliness of food containers, dishes, utensils
- (h) observance of personal hygiene rules (body and clothing)
- (i) participation in community clean-up work.

DAILY SHELTER REPORT

SHELTER: _____ DATE: _____

CARETAKER: _____

AGE GROUP

	0 - 1	1 - 5	5 -15	15-60	60+
Nr of WOMAN					
Nr of MAN					
TOTAL:					
Nr of CASES WITH					
FEVER					
FEVER with diarrhoea					
FEVER with cough					
FEVER with jaundice					
DIARRHOEA					
VOMITTING					
DAIRRHOEA & VOMITTING					
RASH					

ENVIRONMENTAL HEALTH SHELTER REPORT

WATER SUPPLY AVAILABLE? ☐ PIPED; ☐ TRUCK; ☐ OTHER; ☐ NO;WATER STORAGE AVAILABLE? ☐ YES, VOLUME = _____ ☐ NO;SANITARY FACILITIES AVAILABLE? ☐ YES, ☐ NO;
Describe _____IS GARBAGE COLLECTED? ☐ YES; ☐ NO;ARE PLASTIC BAGS AVAILABLE? ☐ YES; ☐ NO;

	LIST OF SHELTER NEEDS
FOR WATER SUPPLY:	
FOR SANITARY FACILITIES:	
FOR GARBAGE:	

FRAMEWORK FOR SHELTER MANAGEMENT HANDOUT

The shelter management handout should not only be used in disaster preparedness procedures, but also be distributed to shelter managers who emerge spontaneously from the affected population and were not prepared to act as shelter managers. Have in mind that these people are not always very educated and the messages should therefor be very simple and clear.

The first sheet to be prepared is the registration form (see attached draft). This sheet is a cumulative record of the people in the shelter, more sheets will be needed for bigger shelters. In addition to the registration form, a daily shelter report has to be filled out preferably in the evenings when all people are in the shelter (see attached draft).

The handout should be as brief as possible and indicate with short and clearly, easily understandable text, preferably with images, messages in the following areas:

(the list below is not complete and additions should be made as necessary)

AREA	MESSAGE
1. personal hygiene:	wash hands before preparing food; wash hand after squatting and changing diapers;
2. sanitation	use latrine or dig hole and cover excrteta; clean latrine daily;
3. water supply	do not waste water drink only boiled or disinfected water
4. garbage disposal	use plastic bags bring garbage to designated storage area
5. food handling	wash hands before handling and cooking food -add more messages reghards storage and preparation etc.-
6. vector control	-more messages to be added-

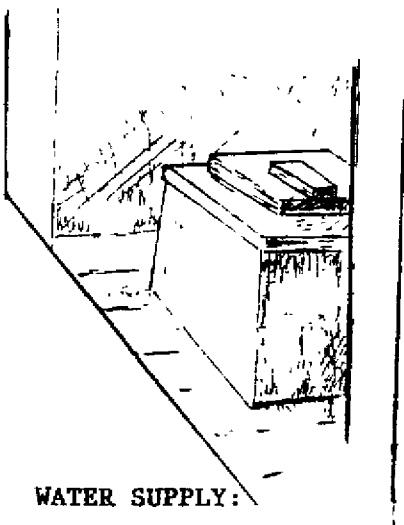
SHELTER MANAGEMENT HANDOUTS

PERSONAL HYGIENE:



- Clean self regularly
- Keep children away from garbage area and toilets.
- Keep self looking clean and tidy at all times
- Wash hands before preparing food
- Wash hand after using the toilet and changing diapers.

SANITATION:



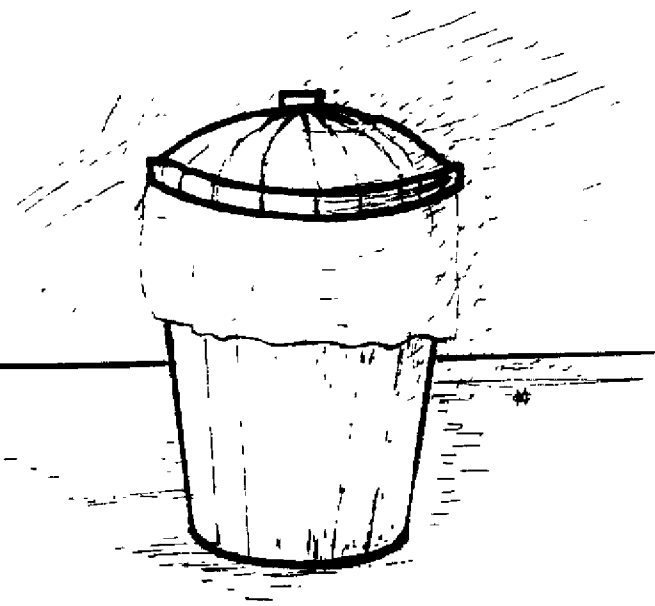
- Use latrine or dig hole and cover excreta
- Clean latrine daily
- Keep in and around shelter clean at all times

WATER SUPPLY:



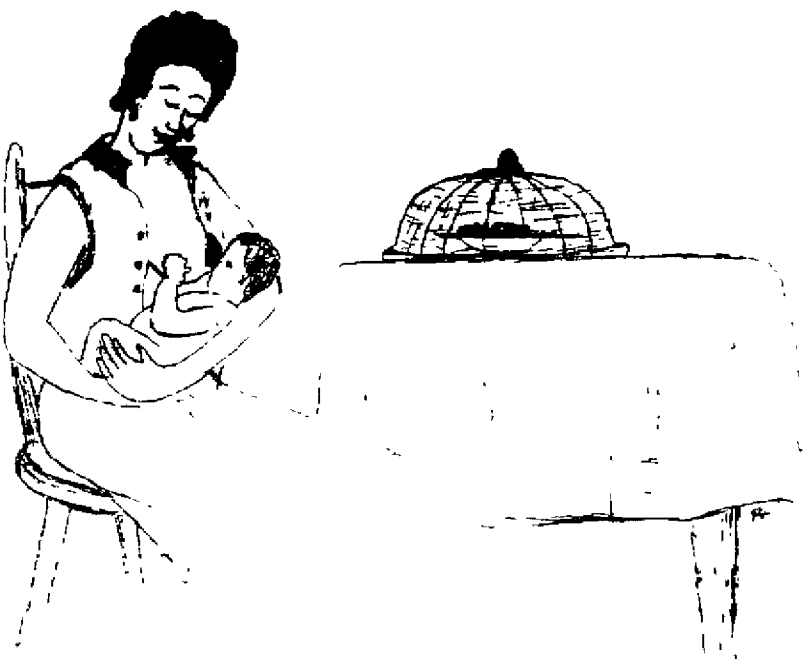
- Drink only boiled or treated water
- Keep water containers clean and covered
- Do not waste water.

GARBAGE DISPOSAL:



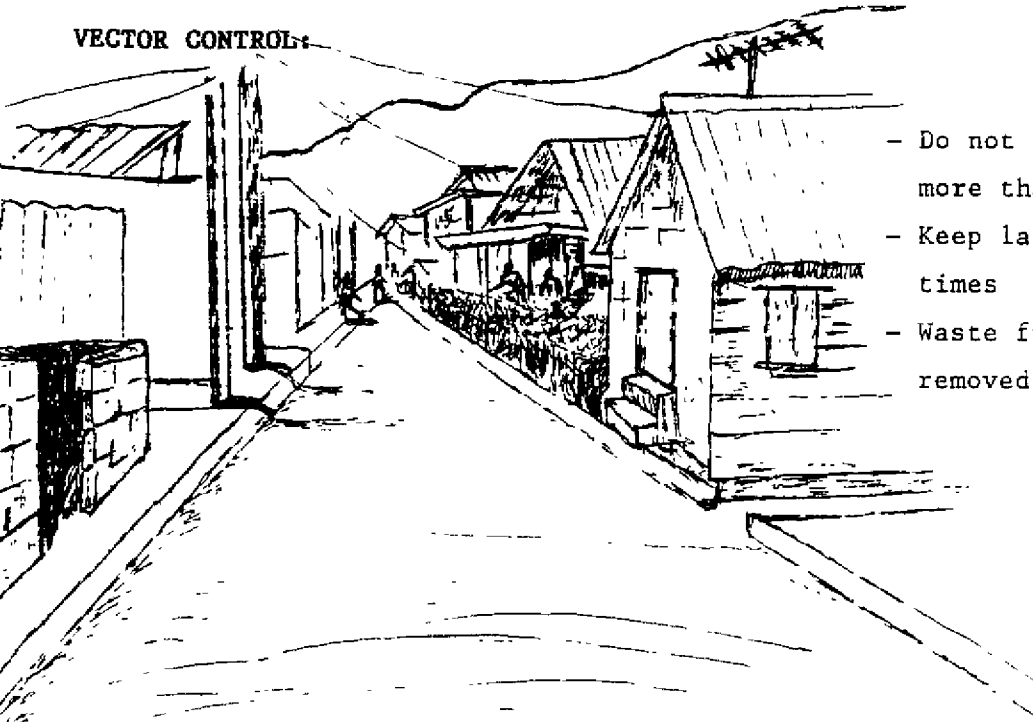
- Use garbage bin to store garbage
- Keep garbage bin covered at all times
- If possible, burn all waste that can be burnt
- Bury tin cans, bottles, coconut shells and any other container that can collect water.

FOOD HANDLING:



- Be ware of food with bad smells and colour change
- Do not use food in badly dented or swollen looking cans
- Wash hands often while preparing food
- Always prepare sufficient foods to be used in one day
- Left overs if not used on the same day must be thrown away
- Wash pots and pans before and after cooking
- Store raw foods away from wall and off the floor
- Excess meat and fish must be salted and seen dried
- Only the amount of milk for one bottle feed must be prepared
- Baby bottles must be washed after each feed and stored in a covered container. Left over milk must be thrown away
- Area where food is prepared must be cleaned after use, especially over night
- Prepared foods must be covered at all times
- Examine all food stuffs for signs of spoilage

VECTOR CONTROL:



- Do not store garbage on compound for more than one week
- Keep latrine clean and covered at all times
- Waste from preparation are must be removed daily.

RULES AND REGULATIONS:

- There must be no chain smoking at the shelters
- No one must lie down(go to bed) smoking
- No gambling in the shelter
- No obscene language must be used at the shelter
- Persons not living at the shelter must not loiter in and out
- The shelter must not be used as a thorough fare
- There must be no fighting in the shelter
- After 6:00pm no one should be allowed to leave the shelter without special permission
- No visitors must be at the shelter

RULES AND REGULATION (CONT'D)

- Supplies and equipment must be appropriately used
- Inventory of all supplies and equipment received, used, and missing borrowed and lent must be kept.

**PERSONS NOT COMPLYING MUST BE
EXPELLED.**

PREPARED BY:

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DISTRIBUTION SYSTEM

LOCALITY _____ AREA: _____

SECTION _____

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[_] normal
[_] lower than normal
[_] no pressure
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[illegible][illegible]

DAMAGE AND NEEDS ASSESSMENT FORMS FOR WATER SUPPLY SECTOR

STORAGE TANKS

NAME SURVEYOR: _____ DATE: _____

LOCATION OF STORAGE TANK: _____

ACCESS: ☐ TRUCK; ☐ JEEP; ☐ FOOT;
 ☐ BOAT; ☐ AIR; ☐ NO ACCESS

WHAT IS CAPACITY OF TANK? _____ MGls

WHAT IS WATER LEVEL IN TANK?

☐ FULL; ☐ 3/4 FULL; ☐ 1/2 FULL; ☐ 1/4 FULL; ☐ EMPTY?

DESCRIBE ANY DAMAGES TO TANK:	AND NEEDS:

IS TANK AND ITS CONTENTS SECURED AGAINST
UNAUTHORISED TRESPASSING AND USERS?

☐ YES; ☐ NO.

COMMENTS _____

DAMAGE AND NEEDS ASSESSMENT FORMS FOR WATER SUPPLY SECTOR

WATER TREATMENT PLANT:

NAME SURVEYOR: _____ DATE: _____

NAME TREATMENT PLANT: _____

NAME SUPERVISOR OF PLANT: _____ TEL: _____

ACCESS: ☐ TRUCK; ☐ JEEP; ☐ FOOT;
 ☐ BOAT; ☐ AIR; ☐ NO ACCESS

IS TREATMENT PLANT OPERATING NORMALLY? ☐ YES; ☐ NO;

NORMAL CAPACITY: _____ PRESENT CAP: _____ MGls/Day

NORMAL INFLOW: _____ PRESENT INFLOW: _____ Gls/Hour

DESCRIBE TURBIDITY/APPEARANCE OF:

INCOMING WATER	OUT-FLOWING WATER

IS POWER SUPPLY AVAILABLE?

MAIN: ☐ YES; ☐ NO; STAND BY: ☐ YES; ☐ NO;

DESCRIBE DAMAGES TO POWER SUPPLY:	AND NEEDS:
MAIN	
STANDBY	
CONTROLS	

DAMAGE AND NEEDS ASSESSMENT FORMS FOR WATER SUPPLY SECTOR

WATER TREATMENT PLANT (cont'd)

DESCRIBE ANY STRUCTURAL DAMAGES:	AND NEEDS:

DESCRIBE ANY DAMAGES TO EQUIPMENT, PIPING, FILTERS, etc.:	AND NEEDS:

INDICATE WHICH AND HOW MUCH CHEMICALS ARE AVAILABLE AND NEEDED

CHEMICALS	AVAILABLE	NEEDED

COMMENTS: _____

DAMAGE AND NEEDS ASSESSMENT FORMS FOR WATER SUPPLY SECTOR

WATER SOURCE

NAME SURVEYOR: _____ DATE: _____

NAME WATER SOURCE: _____

ACCESS: ☐ TRUCK; ☐ JEEP; ☐ FOOT;
 ☐ BOAT; ☐ AIR; ☐ NO ACCESS

DESCRIBE ANY BLOCKAGE AT ROADS:	AND NEEDS TO CLEAR ACCESS

INDICATE TYPE OF WATER SOURCE: ☐ SPRING; ☐ RIVER INTAKE;
☐ WELL; ☐ DAM; ☐ INFILTRATION GALLERIE; ☐ OTHER

IS SOURCE OPERATING NORMALLY? ☐ YES; ☐ NO;

NORMAL CAPACITY: _____ PRESENT CAP: _____ MGls/Day

NORMAL INFLOW: _____ PRESENT INFLOW: _____ Gls/Hour

DESCRIBE TURBIDITY/APPEARANCE WATER: _____

DESCRIBE ANY DAMAGES TO:	AND NEEDS:
MAIN	
STANDBY	
CONTROLS	
PUMPS	
MOTORS (FLOODED)	
BLOCKED INTAKE	
SILTED INTAKE	
STRUCTURAL	

DESCRIBE ANY OTHER PROBLEMS	
CONTAMINATIONS	
OTHERS	

DAMAGE AND NEEDS ASSESSMENT FORMS FOR WATER SUPPLY SECTOR

TRANSMISSION SYSTEM

NAME SURVEYOR: _____ DATE: _____

PIPE FROM: _____ TO: _____

LENGTH: _____; DIAMETER _____; TYPE _____;

Nr OF STREAM CROSSINGS _____; CROSSINGS DAMAGED _____;

DESCRIBE ANY DAMAGES TO MAIN:

AND NEEDS:

OTHER COMMENTS: _____

DAMAGE AND NEEDS ASSESSMENT FORMS FOR SANITATION SECTOR

TREATMENT PLANT

NAME ~~SUBSTATION~~ _____ DATE: _____

NAME TREATMENT PLANT: _____

NAME SUPERVISOR OF PLANT: _____ TEL: _____

ACCESS: ☐ TRUCK; ☐ JEEP; ☐ FOOT;
 ☐ BOAT; ☐ AIR; ☐ NO ACCESS

IS TREATMENT PLANT OPERATING NORMALLY? ☐ YES; ☐ NO;

NORMAL CAPACITY: _____ PRESENT CAP: _____ MGls/Day

NORMAL INFLOW: _____ PRESENT INFLOW: _____ Gls/Hour

DESCRIBE ANY DAMAGES TO:	AND NEEDS:
POWER SUPPLY	
STANDBY	
CONTROLS	
STRUCTURES	
MECHANICAL	
PUMPS	
MOTORS	
UNITS	
OTHERS	

CHEMICALS	AVAILABLE	AND NEEDED

COMMENTS: _____

NEEDS ASSESSMENT SUMMARY FORM FOR WATER SUPPLY SECTOR

COMPILATION-SHEET (for EOC)

PARISH	REMAINING % OF CAPACITY	URGENT NEEDS < 1 WEEK	MEDIUM TERM NEEDS >1 WEEK

DAMAGE AND NEEDS ASSESSMENT FORMS FOR SANITATION SECTOR

SEWER SYSTEMS

NAME SURVEYOR: _____ DATE: _____

LOCALITY _____ AREA: _____

SECTION _____

% OF POPULATION CONNECTED TO SEWER SYSTEM: _____

% OF HOUSEHOLDS WITH DAMAGED SEWER CONNECTIONS: _____

% OF HOUSES WITH NO CONNECTION TO SEWER SYSTEM: _____

DESCRIBE ANY VISUAL INDICATIONS OF LEAKAGES:

LOCATION	LEAKAGES	NEEDS

IS SEWAGE RUNNING IN STREETS? ☐ YES; ☐ NO;

IS SEWAGE RUNNING INTO BUILDINGS? ☐ YES; ☐ NO;

IS SEWAGE RUNNING INTO WATER MAINS? ☐ YES; ☐ NO;

IS SEWAGE RUNNING IN RIVERS? ☐ YES; ☐ NO;

ANY WERE ELSE? _____

DAMAGE AND NEEDS ASSESSMENT FORMS FOR SANITATION SECTOR

COMPILATION SHEET (for EOC)

PARTIAL	REMAINING % OF CAPACITY	URGENT NEEDS < 1 WEEK	MEDIUM-TERM NEEDS >1 WEEK